CHAPTER IV: RESEARCH TECHNIQUES

It is a need of time to do work systematically and logically to maintain transparency in process and gain goodwill as well as faith of customer. We often see annual status reports of various branded companies. At the same time, the process of making a product is also considered equally valuable. Because the product may be the same but it is a process of its making that makes its more or less valuable. The systematic process of development of any software product will make it easy to apply that product, to repair that product as well as to replace that product on the demand of time. This systematic methodology is a basis of my research work.

4.1 Necessity of Techniques

Software engineering techniques includes the disciplinary way of development of software productions which will make it efficient and cost effective. The most of the subject areas around us are relevant to development of human being. For accepting today’s challenges and tomorrow’s opportunities, people can be used software engineering methodology for studying external field applications.

The system or various policies are developed but it still not functioning as per the required manner and not to get desired outcome within the scheduled period. Research also required satisfying the future opportunities in the various subjects. While carrying the research, researchers need the suitable techniques which provide more stress on defective prevention in the selected research area and to improve process and research quality during early stage of final conclusion development. In various situations require preventive measures for the quality output during the early phase of research development. If the study is carried out in an organised, logical, meaningful way and repeatable manner then the research result will get meaningful conclusion. Research should be open minded to avoid prejudiced result and also needs to be unbiased systems. The stages of streamlining process are to study, design, develop, implement, support and manage of computer based information system. Particularly it incorporates both the applications software as well as hardware which support basic transaction of software applications.
When client is satisfied with the software product, then it can be used in longer time. There will be scope after certain duration for modification to improve the system. On the opposite side, if fail or error occurs the it is very difficult to modify. Therefore, approach of software building in engineering type.

4.2 Generic View of Software Engineering

Engineering is the Detailed examination, preliminary plan, interpretation, establish the truth, public undertaking of technical (or social) entities. Considering the entities to be engineered, the below mentioned questions should be called for answered

- What is the problem?
- What characteristics are used to solve the problem?
- How will the entity be realized?
- How will the entity be constructed?
- What approach will be used to uncover errors?
- How will the entity be supported over the long term? We focus on a single entity – computer software [69].

4.3 System study

Software developments life cycle is nothing but a process of creating and maintaining a good computer based system. Main objective of SDLC is to deliver an application that fulfils the customer requirements. This can be achieved through a systematic, step-wise manner called software development models. As the nature of application, technology, hardware and software platform have evolved, models to suits this evolution came to existence. Software development undergoes phases like – requirement gathering, feasibility study, analysis and design, coding, testing and implementations.

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Software</th>
<th>Data</th>
<th>Procedure</th>
<th>People</th>
</tr>
</thead>
</table>

Figure 14: Software Development scope
4.4 Merits of Model

Classical Water Fall Model

The Classical Waterfall Model (CWM) is the basic model for development of software products. The model is used for development in theoretical way. This model is a basic foundation of other model. Then study this model at all? The reason is that all other life cycles models are in some way or other based on the classical water fall model. It is the model that is normally adhered to for developing software documentation.

Phases of the Research Process

Following are the steps we have compared as a research technique in view of our defined objectives.

4.4.1 Identifying the problem

The first step in research is identifying and understanding the research problem. What is problem? What type of information is required to solve it? What segments of related information are already available? Research also makes use of the available literature for an in depth background study of the problem and a marketing researcher must define the research objective clearly.

➢ In this steps refer for the System study.

Developing Research strategy

A researcher should design the research strategy in accordance with the requirements of the problem. He should make certain hypothesis, the testing of which would be considered helpful in solving the problem

➢ In this steps refer for the Feasibility study.

Collection of Data

A marketing researcher has to make a plan for collecting secondary data, primary data or both, as the case may be. Primary data gives the original information for specific purposes whereas secondary data consists of information that already exists. Primary data can be collected through experiment or through survey.

The Research process

4.6 Procedure Model

The model involves the following phases –
Feasibility Phase applied to Study -

⇒ The above phase is used for the selection of subject and checked the availability of concerned information. Referred the different types of literature and prepared the abstract definition of the subject.

Requirement Analysis and Specifications: The objective of this phase is to understand exact requirement of the customer. Careful analysis on requirement and document it properly. Project objectives should be clear in this phase. The goal of this phase is to collect all data and information in perspective understating the customer requirement. User requirements should be properly organized and documented in Software Requirement Specification (SRS) document.

Types of Requirements

While requirements are being gathered from the clients, they can be categorized into functional requirements and non-functional requirements.

Functional requirements are the ones which are part and partial of a software and software can not have any existence without these requirements. These are the functions which form the basis of the application.

Functional – Input/output
- Processing
- Error handling

Non-functional requirements are those which do not have direct impact on functioning of software application, but still remain to be areas of concern for customers. These are generally termed as FRUPS, i.e.

Non-Functional - Flexibility
- Reliability
- Usability
- Performance
- Security

Applied to Study -

⇒ Up to this phase the subject area has been finalized. To collect all relevant data, information and interviews. Received the filled questionnaires with the
concern people. Read the various relevant journals, magazines, literature, books etc. in view of research study.

- In this phase decided planning, scheduling and risk identification of the study work. This is helpful for reducing developmental effort and time to complete task.

- To provide proper information to the project managers and relevant people during the working of project. Metric of project is one of the important concept on the basis of earlier similar project. The information of Cost estimation and time calculation will get easy by using this concept.

- The software development concerns follow and accept the path of project and various activities during studying of project metrics concepts. It is mainly based on experience of earlier projects. Estimation is the initial application of project metrics [69].

There are two ways in which software product measurements may be used:

- To make general prediction about a system. By measuring the characteristics of a system component and then aggregating these measurements.

- To identify anomalous components. Measurement can identify individual components whose characteristics deviate from some norm [64].

**Applied to Study** -

- While carrying out the research work, the relevant information from available resources is collected. After collecting this information it is required to study the procedure by using various methodologies, techniques to achieve the significant outcome.

Following are some of the design tools used in the process

- Data Dictionary
- DFD
- E-R Diagram
- Software Metrics
- Agile Process
- Legacy system
- CASE
Data Flow Diagrams: Specifying Function of Systems

Data flow diagrams (DFDs) are a well-known and widely used notation for specifying the functions of an information system and how data flow from functions to functions. They describe systems as collections of functions that manipulate data [11].

![DFD of Data Analysis](image)

Figure 15: DFD of Data Analysis

**Applied to Study -**

Partition of the system is created. Significant modules like data from questionnaires, service report, audit report, various type of customers. Information from management and employee of the concern system are studied. Such type of modules made easy to analyze the information and data for finding out the facts. Initial report is ready in this phase.

**Applied to Study -**

In this phase all modules of the system have checked individually and all module results are collected. All modules are assembled. The analyzed the data by using various techniques and methodologies. Reviews the outcome and result analysis is prepared.
Applied to Study –

In this phase, the enhancement and limitations of the research study work has been decided. The fact of future demand, requirement, global competition etc. for enhancement of the research project are considered.

SE Data Collection: Role of Validation

- SE data is error prone and needs careful validation.
- Validation should be performed concurrently with software development and data collection.
- Automated tools can be useful in data collection and validation, e.g. range checks, conditional entries, check digit, etc.
- Training, clear guidance, instruction, and education about the use of data, etc. can help in improving the quality of data.
- Where possible, the data collection activity should be merged with the configuration management activity [67].

4.7 Research View

It is a cream view of research to look towards subject in terms of established fact by a systematic investigation. To make an advancement in existing stock of knowledge by providing inner (original) contribution. Another way to say that, produce answers through scientific methodology by the questions is the main intention of research. The principle aim is to find out the reality which is behind in the process. Every research activities have its own clearly and defined objective. Research objectives as falling into a number of following broad groupings:

1. To gain familiarity with a phenomenon or to achieve new insights into it (studies with this objectives in view are termed as exploratory or formulate research studies);
2. To portray accurately the characteristics of a particular individual, situation or a group (studies with this object in view are known as descriptive research studies);
3. To determine the frequency with which something occurs or with which it is associated with something else (studies with this object in view are known as diagnostic research studies);
4. To test a hypothesis of a causal relationship between variables (such studies are known as hypothesis-testing research studies) [10].

**4.8 Research View Aspect**

While carrying out the external field study work, the relevant information from available resources is collected. After collecting this information it is required to study the procedure by using various methodologies, techniques to achieve the significant outcome.

Established system parameters in view of software engineering’s techniques. With respect to software metrics concepts, followings parameters described in the chart which are used for tabulation of the object oriented facts.

A researcher needs to investigate a wide range of topics to meet the present challenges in today's society. Many challenges available in every corner of life. It can be possible to get the precious solution by using available resources and reliable techniques. Software products are prepared very carefully by considering all possibilities and relevant parameters. This software used for most of the trusted and sensitive areas. The software product executes as per the user instructions and it works properly. Software engineers prepare a software product by systematic way, well disciplined manner and cost effectively. This approaches of software engineering techniques are lucrative when researchers carried out their research work since inception to end result in any domain. It requires various types of planning so that researchers will achieve their objective. In software Engineering, Software Development Life Cycle (SDLC) models are available and other relevant techniques use for development of software product. Researchers can be referred SDLC models for their research subject and other software engineering techniques.

The major technical and economical changes are undergoing in the present scenario. All changes do not take place in constant pace. The technology we need that to makes our lives happy and healthy. Many problems in various disciplines which are still waiting for the solutions. Most of the significant services like medical, military, telecommunications, industrial, entertainment transportation, education, the list is almost endless which embedded software in the system and provides services to the people with their satisfaction level. It means that most of the systems which is having
huge amount of risk still in that software uses for carrying out the work and obtain the desired outcome. Therefore for making of software product people requires well planning, discipline, carefulness and serious consideration of other dependent parameter by using engineering approach. An engineering approach, it includes various methods, technologies, scientific methods to solve the complex problem efficiently and obtain optimistic solution by using available resources.

The most of work of human being is done by the software. The software made by the software engineers. The engineers have a wide knowledge to solve the problem efficiently and resolve the complex problem by using software methodology techniques. Software carried out most of the significant task with their appropriate goal.

4.9 General Research Process

The research, it is a systematic investigation of established fact. While studying on research topic, a researcher uses various types’ techniques and methodology for obtaining the significant outcome. It included scientific techniques and technological methodologies. The research problems deal with various disciplines. The people adopt the method that should be varied for their research domain. The thing which are available from that they are going to find out the useful conclusions. The significance of the research is there should be some change in existing situation. While doing the research people require various scientific methodologies so that they should helpful to get the precious results. Various methodologies available now a days to test the result or compare the collecting relevant data. The obtainable methods is comfortable for the project depend on different kind of relevant parameters. It requires framework, structure, plan and controlling parameters for research field. To carry out research, it is important to set the objective which will be vary discipline to discipline in any domain. This objective change depending on nature of the research problem.

On the basis of that research can be defined as to make systematic investigation from the available resources and also find the knowledge by using systematic approaches. The research output should be assist to the all type of parameter to overall development of human being to meet today’s challenges and tomorrow’s opportunities. Research can be done for any small type of project work. It can be theoretical as well as practical based.
Research Methodology

A research methodology includes all activities of research like how to proceed, what are the parameters to measure the progress and parameters of success. It’s collective term for the structured process. Research methodology contains research design, data gathering and data analysis. In short research methodology is a way to systematically solve the research problem.

Research methodologies can be quantitative or qualitative or to test the hypotheses or theories. Some time research methodology also referred to as research methods and contains procedures followed to analyze and to make interpretation the data gathered. Researchers use sophisticated analysis on the data collected by using statistical methods to produce significant result.

To find the research area for that to refer the feasibility phase for selecting feasible subject area. If it is feasible then to referred the other phases in SDLC. Once the research topic will be finalized then researcher can refer the same way of other phases and various methodology of software Engineering for doing research work.

4.10 Component Used For Research Methodology Description of SDLC

The followings are the various phases of the Software Development Life Cycle model and its significant references with respect to research study.

Feasibility study: The main aim of the feasibility study is to check whether the developing product is technically and financially feasible. It also involves problem analysis and collection of relevant data which would be the foundation of the system. After collecting the data and analyses the following you will get various points like – An abstract definition of the problem, formulation of the different solution strategies and examinations of various strategies on the basis of required resources with respect to cost and time.

⇒ Initially, aspirants of researchers in dilemma for selection of subject or research area. The publications and area some time very much broad. To avoid such type of confusion. People will refer feasibility phase as a role model phase for selection of the topic. Feasibility study will helpful for review literature to the selected subject and apply various type of the strategy.
I have referred the feasibility phase in view of my study. This phase was supported me to avoid the confusion of selection process of the subject area. I have referred the various subject relevant information for this study.

**Requirement Analysis and Specifications:** This phase is undertaken once the first phase of SDLC is completed and the project is found to be financially and technically feasible. The objective of this phase is to understand exact requirement of the customer and analysis it carefully and to document it properly. Objective should have cleared in this phase. To fulfillment of the objective the other phases is useful. It includes two distinct activities: Requirement analysis and Requirement specification.

In requirement analysis, few development team members visit the customer site. The goal of this phase is to collect and analyze all related data and information in perspective understating of the customer requirement. One of the vital points is to weed out inconsistencies and proceed to write the document called Software Requirement Specifications (SRS) document. In requirement specification, the user requirements are properly organized and documented in Software Requirement Specifications (SRS) document. SRS is just like agreement or contract between customer and software development team. Once the customer agrees to the SRS document, then development team proceeds to develop the software product.

The SRS document organized in the following ways and should be referred for the preparation of research synopsis.

1. **Introduction**
   a) Background
   b) Overall Description
   c) Environment Characteristics
   d) Interfaces
      - Interface with devices
      - Interface with Operating System
      - Interface with Databases used, if any
      - Interface with the users
   e) Constraints

2. **Functional Requirements**
a) Functional Partitioning  
b) Functional Description  
c) Control system  

3. Behavioral Description  
a) System States  
b) Events and Actions  

4. Validation Criteria  
a) Performance Bounds  
b) Classes of Tests  
c) Response to undesired Events  

⇒ Once the area of research has been finalized, then to collect all relevant data, interview with the relevant people, industry, and other related parameter. Collect all type information’s and analyzed it weeding out inconsistencies and incompleteness in these phase.  

Software Project Management  

After finishing the activities of SRS, then next activities will be to estimate size, cost and development time of the project. Effective software project management is crucial for the success of any software project.  

In the late nineties, three important studies were carried out by three leading research groups and findings presented under the titles:  

• Pattern of software systems failure and success [jone, 1996]  
• Chaos [Standish group, 1995].  
• Report of the defense science board task force on acquiring defense software commercially [Defense Science Board, 1994].  

The essence of the findings were –  

• PM technologies contribute heavily to the success of project.  
• Projects fail predominantly on account of following:  
  ▪ Non-usage of historical software measurement data  
  ▪ Non-usage of estimation tools.  
  ▪ Non-usage of planning tools.  
  ▪ Failure to monitor progress linked to milestones.
- Application of ineffective architecture.
- Failure to use scientific development methods
- Ignoring formal risk management as a part of development process
- More than 30% user requirements creep in informally.
- Factors that affect the projects are:
  - Level of user involvement: the higher the better
  - Executive management believing and supporting formal SPM practices
  - RDD: clear, complete, correct, stable, supported by users
  - Proper planning after estimation of efforts, assessment of risk, and confirming the feasibility of the project
  - Realistic achievable project expectations.
  - Realistic achievable product functions and features.
- Factors which fall into technology area and that affect the smooth development of software projects are:
  - Inefficient software process management.
  - Non-integration of product teams.
  - Very little attention paid to hardware and software architecture.
  - Non-adherence to standards, protocol and best practices.
  - Incorrect choice of technologies: development, implementation, and deployment.

These findings in a way call for an application of formal software project management methodologies which will ensure that the project has a clear vision and earns profit through productivity of resources, using project management practices. Further, application of software project management methodology would ensure that factors adversely affecting both the project and the product are controlled.

Software project management is hard work. It requires dedication and commitment to a goal. Though CASE tools, technologies and best practices are necessary, what is more crucial is discipline in management process. It requires the full commitment to the classical definition of management and its full implementation in spirit and in practice.
Software Project Management (SPM) begins with basic management cycle steps: set the goal, planning, organizing, scheduling, staffing, co-ordinating and control to achieve the goal. These steps become operational after the project proposal is accepted by the customer and requirement analysis is carried out resulting in an RDD (Requirement Definition & Description) confirmed by the customer.

**SPM Basic Concepts**

In order to conduct a successful software project, we must understand the following points.

- Scope of work to be done
- The risk to be incurred
- The resources required
- The task to be accomplished
- The cost to be expended
- The schedule to be followed [82].

**Project planning**

Project planning gets very importance during the project work once it is found to be feasible. Software project managers undertake the project planning which contains effort, cost and project duration estimation. The other parameters are tentative risk identification, analysis, project scheduling and staff organizations, staffing plans etc.

Project planning is the most significant activity for development of software product if the developing product is found to be feasible. Software project managers undertake the project planning which contains effort, cost and project duration estimation. The other parameter like tentative Risk identification, analysis, project scheduling and staff organizations, staffing plans.

Estimation of effort, cost, resource, and project duration is an important component of project planning. During the project planning stage is the selection of a suitable development process model. Different problems require suitable tailoring of the standard process model adopted by a company.

**Applied to Study**

⇒ Up to this phase the subject area has been finalized. To collect all relevant data, information and interviews. To get filled questionnaires with the concern
people. To refer various relevant journals, magazines, literature, books etc. in view of research study.

△ In this phase to decide planning, scheduling and risk identification of the study work. This is helpful for reducing developmental effort and time to complete task.

△ In this phase researcher can interact with concern persons, management, employee, and customer and collect the precious data.

After project planning is complete, project managers document the results of the planning phase in a Software Project Management Plan (SPMP) document whose general structure is shown below.

We list below the important items that should included in SPMP

Organization of the Software Project Management Plan (SPMP) Document

A. Introduction
B. Estimates of Project
C. Plan for Risk Management
D. Schedule
E. Resources of Project
F. Organization of Staff
G. Control Plan and Project Tracking
H. Miscellaneous Plans

4.11 Project Size Estimation Metrics

This metric refer to measure the program size. The size of a program is not the number of bytes that the source code occupies nor the byte size of the executable code but is an indicator of the effort and time required to develop the program. In other words, the size of the program indicates the development complexity.

Estimating the problem size is fundamental to estimating the effort, time and cost of a planned software project. There are several metrics to measure problem size.

Lines of Code

The easy method to count the problem size is lines of code. It is very convenient to applicable. It requires the instructions to obtain the solution of the problem. Comments
and header lines are refuse during this procedure. It is simple at the end of a project for estimating the LOC count but it is tricky at the beginning of a project for estimation.

**Function Point Metric**

The function point metric overcomes some of the shortcomings of the LOC metric. The benefit of the function point metric is to calculate the size of product on the basis of problem specification. The main concept of this metric is the size of developmental product is immediately based on the quantity and type of separate activities it performs. It calculate the size of a software product depending on five separate characteristics of the product.

\[
\text{Size of a problem in FPs} = (\text{Number of inputs}) \times 4 + (\text{Number of outputs}) \times 5 \\
+ (\text{Number of inquiries}) \times 4 + (\text{Number of files}) \times 10 \\
+ (\text{Number of interfaces}) \times 10
\]

**Project Estimation Techniques**

During the project planning the following parameters should be estimated. These estimates help not only in quoting the project cost to the customer, but also in resource planning and scheduling.

- Project size
- Effort required to develop the software
- Project duration
- Cost

There are three main techniques of estimating project parameters

- Empirical Estimation Techniques
- Heuristics Techniques
- Analytical Estimation Techniques

**Empirical Estimation Techniques**

It is based on making an educated guess of the project parameters using past experience.

In the past experience techniques are based on common sense, different activities involved in estimation have been formalized over the years.

**Heuristics Techniques**
In this estimation techniques the project parameters can be used in mathematical expression for building modeled. The heuristics estimation models can be divided into following three classes:

1) Static single variable models
2) Static multivariable models
3) Dynamic multivariable models

**Static single variable models**

It is calculated on the basis of previous estimated characteristics of the software product such as its size.

\[
\text{Resource} = c^1 \times e^{d_1}
\]

Where, \( e \) is a characteristics of the software which has already been estimated and the resources to be predicted could be effort, project duration, staff size etc. Constants \( c^1 \) and \( d_1 \) can be determined using the data collected from the past project.

The Constructive cost estimation Model was proposed by Boehm [1981]. According to Boehm, there are three important classes of software products like organic, semidetached, and embedded. Mainly the software products are utility, system programs and application program. Utility program contains linker, compilers creation, System programs contains real time system and operating system program etc. Function programs and Data processing includes the application program category. Followings are the Boehm [1981] views regarding organic, semidetached, and embedded systems.

A. Organic : Applications program in well-understood problem
B. Semidetached: Mostly familiar experience of project and mixed staff
C. Embedded: Strongly hardware relevant software.

With reference to fundamental law of Boehm, rank should be given to various attributes of software product development of the project by the project managers. The rank on the scale from one to three. The initial cost acquired by the basic COCOMO. Depending on these ranking, he suggests that that suitable cost driver values should be multiplied by the initial cost. In general, the cost drivers can be categorized as being attributes of the below mentioned items.

[ As per the principle of Boehm the project manager should give the rating of different parameters (i.e. attributes of software development) for a particular project on a scale of]
one to three. Then depending on these ratings, he suggests that appropriate cost driver values should be multiplied by the initial obtained by using the basic COCOMO. In general, the cost drivers can be classified as beings attributes of the following items.
Product - Inherent complexity of the product, reliability requirements of the product etc.
Computer – Performance time, storage requirements, etc.
Personnel – Observations of personnel, etc.
Development environment – Highly developed tools used [67].

**Design**: The main objective of this phase is that to transform the requirement specification in to a structure which can be suitable for computer programming language. It provides the software architecture from the Software Requirement Specification document. Mostly documented information transform in to graphical model and prepare in to module structure form. The significant parameter in this phase is “what needs to be done?” and seriously avoids “how to do it”

- While carrying out the research work, researchers collect the relevant information from various relevant resources. After collecting these information it is essential to prepare a procedure, use various methodologies, techniques so that to achieve the proper outcome. This makes helpful such as less development effort, time and maintainability.

**Applied to Study** -

- While carrying out the research work, the relevant information from available resources is collected. After collecting this information it is required to study the procedure by using various methodologies, techniques to achieve the proper outcome.

**Coding**: This phase is also called as implementation phase. The main aim of this phase is software design translate in to source code. Each component of design phase is implemented as a program module. Separately tested of program module is treated as unit testing.

- In the research working field most of the time it is necessary to break system in to module form or create significant partitions so that it will make easy to analyze the information and data for finding the conclusions. It is also helpful to remove
the ambiguity of any relevant portion of the project. Complete Initial report should be ready in this phase.

Applied to Study -

Partition of the system is created. Significant modules like data from questionnaires, service report, audit report, various type of customers. Information from management and employee of the concern system are studied. Such type of modules will make it easy to analyze the information and data for finding out the facts. It is also helpful to remove the ambiguity of any relevant portion of the project. Complete Initial report should be ready in this phase.

Integration & System testing: In this phase, those modules created in coding phase, should be integrated in planned manner. It includes step by step procedure for integration of modules and tests it stepwise till completion of system. The system testing should carried out according to its requirement as specified in the SRS document

- In this phase all module of the project should be connected which can be checked individually. To prepare the model and check the relevant data by using various techniques and methodologies for getting the conclusions and project should get ready in all corners with proper outcome.

Maintenance: Technology is changing rapidly. After completion of the software product and delivered to the customer it’s actual utilization starts. Utilizing software product for long time. Some time due to changing technology and new requirement of the customer, it requires modifying the existing software product. It is necessary to have up-dation of the software. In this phase software engineers have the facility to modify the software product as per the requirement.

- This phase should be treated for the research fellow for limitations and enhancement of the research work. While carrying the research activity researchers also consider the fact regarding limitations and enhancement of the research project.

Applied to Study -

- In this phase, the enhancement and limitations of the research study work would be decided. The fact of future demand, requirement, global competition etc. for enhancement of the research project are considered
Scheduling

Scheduling is an important activity for higher authority. It provides facility and information related to various tasks for completion of project and their dependent parameters, duration and plan for completion of the task.

4.12 An Agile view of process

It gives encourages to the software engineers to prepare the software product early and make it customer satisfaction level. Its techniques which combines philosophy and set of development guidelines in agile software engineering.

⇒ Philosophy is necessary to reduce the load of work and produce the quality research outcome. Its good philosophy for boosting to peruse the work output. Efficient work culture require the philosophy

Legacy system

Updation in the interested subject area in which the existing solution model has been already established. Therefore the thing available and working since long time but it needs modification due to unavoidable changes in such cases we refereed as Legacy system. Fulfillment of latest technological requirements need for developing innovative ideas to meet today's challenges and tomorrow's opportunities Old software need to meet changes as per the latest business requirement and computing platform. The availability of such system is causing serious problem for most of the organizations around the world. Such software must be reengineered so that it remains useful in the future.

⇒ This concept of legacy software should be treated as choosing various subjects and domain areas available around us. People are still working but the desire result not properly obtain. Such type of situations can be treated as under legacy system.

System Development Cycle

All system, whether manual or computer based, should be adaptable to change. The old system when converted, may operate satisfactory for some time, but may need either maintenance or addition/alteration due to certain changes or other minor problems. The length of systems operations phase depend will depend upon the planning effort that
went in establishing that system. However, system development is an ongoing process reflected in the systems development cycle given below.

SE is to reduce the complexity of the problem is one of the objectives. Software engineering deals with various tools, methods and integrates the process for the development of software as per the requirement of customer. It define various models and its objective is to define set of frame work activities, a collection of task that are conducted to accomplish each activities, produced consequences in advance of the task and set umbrella activities that reflect the entire system process.

Keeping Software Engineering methodology as a role model for the research study which was helpful and maintained proper coordination of study and analysis. The Software techniques able to get services to the people in a various technical ways.

When researchers starts the work to build the system or analyze the collection of data, it is very important to go through a series of a predictable steps and proposed schedule that helps to produce a timely and high quality result.

The various types of software tools, software process models and software engineering methods have been adopted successfully across a broad spectrum in various industry applications for development of software product.

In software engineering, a software development methodology is refers to the raw skeleton for the particular research domain for systematic investigation to established facts and values. The skeleton/frame work use for the planning of the quality research, to make proper structure and the control the relevant process for development research product. The organization or problem areas are bound to these types of frame works.

Each of the available methodologies and techniques are going to best suited to specific kinds of projects, based on various technical, organizational and available resources.

The frame work can be design as the process define in SDLC. The first phase of SDLC model the research process the said quality research work is feasible or not. Check the original feasibility criteria. Check the said topic is feasible for research work. The subsection in the feasibility study is concern with financial status. The research areas needs financial aids to calculate the tentative expanses and availability of funds then to complete the first phase. A life cycle models have precise planning activity so that in
every phase to get enough time for planning and confirmation. Task should be completed in time then and then only start another task. This is type of activity comes under entry and exit criteria. Before to start new activity the earlier should be finished with proper objective in every phase of life cycle model. With the help of such well defined entry and exit criteria software project managers to monitor the progress of the project and it provide helps to control and organize systematically various activities. If you strictly adhered to life cycle model, authority should get the current developmental status of the project.

- When researchers starts their research work for building the concern system and analysis of the collection of data, it is very important to go through a series of predictable steps - a proposed schedule that helps to produce a timely and high quality result

Software products are prepared very carefully by considering all possibilities and relevant parameters. This software is used for the most of trusted and sensitive areas. In software Engineering, Software Development Life Cycle (SDLC) models are available and other relevant techniques use for development of software product. Researchers can be referred SDLC models as a reference model and other software engineering techniques for their research subject.